"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLPANOV, L.P.

Theory of electrolysis on a laminated electrode in the case of mixed kinetics. Zhur. fiz. khim. 39 no.9:2270-2273 S '65. (MIRA 18:10)

1. Tul'skiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

1. KHOLPINA I.D.

2. USSR (600)

4. Ulcers

7. Osseous changes in trophic ulcer of neurogenic origin. Arkh.anat.gist. i embr. 29 no.6, 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

AKIMENKO, A.D.; KUZELEV, M.Ya.; SKVORTSOV, A.A.; KHOLSHCHEVNIKOV, A.Ya.

Heating blanks for forging and die stamping in a nonoxidizing heating compartment furnace. Kuz.-shtam. proizv 4 no.6:40-42 Je '62. (MIRA 15:6)

(Furnaces, Heating)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLSHCHEVNIKOV, K.V.

DMITRIEVSKIY, V. I., and K. V. KHOLSHCHEVNIKOV.

Nagnetateli i naduvy aviatsionnykh dvigatelei. Moskva, Oborongiz, 1939. 323 p., diagrs.

Title tr.: Blowers and supercharging of aircraft engines.

Reviewed in Tekhnika vozdushnogo flota, no.10/11. p.145

NCF

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

PHASE I BOOK EXPLOITATION 971

Kholshchevnikov, Konstantin Vasil'yevich and Yemin, Oleg Naumovich

Vybor parametrov i raschet gazovoy turbiny; uchebnoye posobiye (Selection of Parameters and Design of Gas Turbines; a Textbook) Moscow, Oborongiz, 1958. 103 p. 6,000 copies printed.

Sponsoring Agency: Moscow. Aviatsionnyy institut imeni Sergo Ordzhonikidze.

Ed.: Peshkin, M.A., Candidate of Technical Sciences; Ed. of Publishing House: Morozova, P.B.; Tech. Ed.: Garnukhina, L.A.

PURPOSE: This book is intended for mechanical engineering students.

COVERAGE: This book is based on the lectures presented to students of the Moscow Aviation Institute on the design of gas turbines. Various established principles and examples of gas turbine design are presented. The author thanks the following students for their contribution in preparing examples of design: S.Kh. Khorvin, Yu.M. Styazhkin, V.A. Gorelov, and I.S. Mosevitskiy. There are 9 references, all Soviet.

Card 1/4

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

PHASE I BOOK EXPLOITATION SOV/4305

Kholshchevnikov, Konstantin Vasil'yevich

Nekotoryye voprosy teorii i rascheta TRD (Problems in the Theory and Design of Turbojet Engines) Moscow, Oborongiz, 1960. 116 p. Errata slip inserted.

Managing Ed.: A.S. [illegible]ymovskaya, Engineer; Ed. of Publishing House: K.I. Grigorash; Tech. Ed.: V.I. Oreshkina.

PURPOSE: This book is intended for engineers designing turbojet engines and for students of aviation institutions of higher education.

COVERAGE: The book gives information on optimum parameters of turbojet engines, on the adjustment of hydraulic and design qualities of compressor and turbine, and on some other problems in the theory and calculation of turbojet engines. In making the theoretical investigations, separate problems are considered so as to give a more general character to the results obtained and make possible the application of turbojet engines under various conditions. Academician S. B.S. Stechkin was consulted by the author in writing this book.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

The author expresses thanks to O.N. Favorskiy, L.A. Dmitriyeva, and N.I. Agapova for their help. There are 5 references, all Soviet.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

Problems in the Theory (Cont.) SOV/4305

AVAILABLE: Library of Congress (TL709.3.T83K5)

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9-29-60

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ZHIRITSKIY, Georgiy Sergeyevich; prof. [illegible]; LOKAY, Viktor Iosifovich; MAKSUTOVA, Makhfuzya Karimovna; STRUNKIN, Valentin Aleksandrovich; GUROV, A.F., doktor tekhn. nauk, prof., retsenzent; KHOLSHCHEVNIKOV, K.V., doktor tekhn. nauk, prof., retsenzent; KULAGIN, I.I., doktor tekhn.nauk, prof., retsenzent; LEPESHINSKIY, I.A., insh., red.; BOGOMOLOVA, M.F., red.izd-va; NOVIK, A.Ya., tekhn. red.

[Gas turbines of aircraft engines] Gazovye turbiny aviatsionnykh dvigatelei. Moskva, Oborongiz, 1963. 604 p. (MIRA 16:9)

(Gas turbines) (Airplanes—Engines)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLSHEVNIKOV, K.V.

Some properties of an expansion of the perturbation function of an axisymmetrical planet. Uch.zap. LGU no.326:118-126 '64.
(MIRA 18:5)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 26078-66 EWT(d)/EWT(l)/EWT(m)/ETC(m)-6/T-2/EWP(f) WW

ACC NR: AM5027059 Monograph UR/

49
B-41
23

Kholshchevnikov, Konstantin Vasil'yevich

Matching of parameters of compressors and turbines in aviation gas-turbine engines (Soglasovaniye parametrov kompressora i turbiny v aviatsionnykh gazoturbinnykh dvigatelyakh) Moscow, Izd-vo "Mashinostroyeniye", 1965. 0200 p. illus., biblio. Errata slip inserted. 2975 copies printed

TOPIC TAGS: turbine engine, gas turbine engine, turbojet engine, turboprop engine, engine turbine system, turbine design

PURPOSE AND COVERAGE: This book is intended for engineers specializing in aviation gas turbine engines and for students in aviation schools of higher education. The basic principles and methods of calculation for the coordination of the circumferential speed, power, rpm and other compressor and turbine parameters in aviation gas turbine engines of all types are presented.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 26078-66
ACC NR: AM5027059

SUB CODE: 21/ SUBM DATE: 22Jun65/ ORIG REF: 009/

Card 2/2

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACC NR: AR6020756 SOURCE CODE: UR/0269/66/000/003/0013/0013

AUTHOR: Kholshevnikov, K. V.

TITLE: Stability of the orbital motion of satellites in the gravitational field of a nonspherical planet

SOURCE: Ref. zh. Astronomiya, Abs. 3.51.110

REF SOURCE: Byul. In-ta teor. astron. AN SSSR, v. 10, no. 5, 1965, 92-102

TOPIC TAGS: planetary satellite, satellite motion, Lagrange equation

ABSTRACT: The orbital motion of satellites in the gravitational field of an axially symmetric planet was investigated using Lagrange equations. Adequate conditions of stability were derived. Variation limits of the osculating elements and spherical coordinates were determined for satellites which met the conditions of stability. A more accurate estimate of the perturbation function was derived and a case of motion in the equatorial plane was analyzed. L. Ts. [Translation of abstract]

SUB CODE: 03

Card 1/1 UDC: 521.4

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 1452-66 EWT(d) IJP(c)
ACCESSION NR: AP5019938 UR/0043/65/000/003/0155/0158

AUTHOR: Kholshevnikov, K. V. 44,55

TITLE: On the magnitude of coefficients of potential expansion 20 13

SOURCE: Leningrad. Universitet. Vestnik. Seriya matematiki, mekhaniki i astronomii, no. 3, 1965, 155-158 44,55

TOPIC TAGS: potential energy, spheric geometry, body of revolution 16,44,55

ABSTRACT: The rapidity with which the coefficients J_n of expansion in spherical functions of the potential of a body of revolution decrease is studied under the most general assumptions about the structure of the body. Two estimates for the rate of convergence of J_n to zero are adduced, and it is proved that the second of these estimates

$$|J_n| < \frac{C_2}{n^{1/2}}, \quad C_2 = \text{const.}$$

cannot be improved even for a homogeneous body bounded by an arbitrary continuous surface. Orig. art. has: 25 formulas.

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 1142-66
ACCESSION NR: AP5019938

ASSOCIATION: none

SUBMITTED: 30Jun64 ENCL: 00 SUB CODE: MA, AA

NO REF SOV: 002 OTHER: 001

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACC NR: AR6026509 SOURCE CODE: UR/0313/66/000/004/0024/0024

55
B

AUTHOR: Kholshevnikov, K. V.

TITLE: Stability of the orbital motion of a satellite in the gravitation field of a nonspherical planet

SOURCE: Ref. zh. Issl kosm prostr, Abs. 4.62.191

REF SOURCE: Byul. In-ta teor. astron. AN SSSR, v. 10, no. 5, 1965, 92-102

TOPIC TAGS: satellite stability, satellite motion, Lagrange equation, orbit perturbation, equatorial orbit, gravitation field, nonspheric planet

ABSTRACT: Stability of the orbital motion of a satellite in the gravitation field of an axisymmetrical planet is investigated by the Lagrange equation. Sufficient conditions for stability are derived. For satellites meeting stability conditions, the limits of changes in osculatory elements and spherical coordinates are determined. More precise definition of the perturbation function is shown. The case of motion in an equatorial plane is analyzed. [Translation of abstract] [NT]

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Card 1/1 vmb

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 47011-66 EWT(1)/EWP(m) GW

ACC NR: AR6026512 SOURCE CODE: UR/0313/66/000/004/0026/0026

56
B

AUTHOR: Kholshevnikov, K. V.

TITLE: Single-pulse method of correcting space trojectory with the fixed moment of arrival

SOURCE: Ref. zh. Issl kosm prostr, Abs. 4.62.207

REF SOURCE: Byul. In-ta teor astron. AN SSSR, v. 10, no. 5, 1965, 103-108, 349-359

TOPIC TAGS: spaceship, sun, space navigation, Gauss method, fixed arrival moment, space trajectory, fixed space arrival point

ABSTRACT: The article solves the problem of a single-pulse method of ensuring that a spaceship reaches a given point in space at a given moment, a small deviation of its trajectory from the calculated one being known. The trajectory is corrected by a single delta V_0 velocity pulse. Three methods of determining the

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the delta V_o are given. The Oppoltzer method is the simplest and the most direct one to change the initial velocity. Calculations are made only according to algebraic formulas, Cartesian coordinates being used throughout. In case of a wide miss, the Gauss method is evidently the most convenient. The action of the sun is the only external force acting on the spaceship which is taken into consideration. The bibliography has nine titles. [Translation of abstract] [GC]

SUB CODE: 03, 22, 17/

Card 2/2 vmb

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 47316-66 EWT(1)/EWP(m)/T GW

ACC NR: AR6028393 SOURCE CODE: UR/0269/66/000/005/0011/0011

AUTHOR: Kholshevnikov, K. V. 38 B

TITLE: Zero rank perturbations caused by the nonspherical shape of a planet

SOURCE: Ref. zh. Astronomiya, Abs. 5.51.87

REF SOURCE: Byul. In-ta teor. astron. AN SSSR, v. 10, no. 6, 1965, 412-423

TOPIC TAGS: planet, satellite orbit, perturbation, perigee, perihelium

ABSTRACT: The article examines basic perturbations of a nonspherical planet. It is shown that zero rank perturbations, which determine the behavior of a satellite orbit over a long period of time, can be found in quadratures. Moreover, there are no zero rank perturbations in the semi-major axis; for the inclination i and the excentricity e, these perturbations are bounded by periodical functions of time. For small e and i, these elements are trigonometrical functions of time, and $e^2 + i^2 = const$. In the general case, the perigee has a direct mean motion, the node has a retrograde motion and the perigee argument has a direct mean motion. When $i \ll e$ or $e \ll i$, the mean motions of the perigee and the

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 74316-56
ACC NR: AR6028393 O

node follow the same directions, and the perigee argument is a periodic function of time. When arbitrary constants have determined values, particular solutions are possible: e = const, i = const., omega = ± lamda/2, where omega is the perihelium longitude. M. Petrovskaya. The bibliography has 20 titles. [Translation of abstract] [GC]

SUB CODE: 03, 22/

Card 2/2 afs

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

L 21851-66 EWP(m)/EWT(1)/T/EWA(d) IJP(c) GW

ACC NR: AP6006900 SOURCE CODE: UR/0043/66/000/001/0172/0173

AUTHOR: Kholshevnikov, K. V.

48
B

ORG: none

TITLE: A necessary condition for stability of orbital motion 12,44

SOURCE: Leningrad. Universitet. Vestnik. Seriya matematiki, mekhaniki astronomii, no. 1, 1966, 172-173

TOPIC TAGS: Reimannian geometry, Euler equation, gravitation field, solar system, planet, planetary orbit, motion stability

ABSTRACT: The motion of a particle in a gravitational field of an arbitrary body of axisymmetric structure is examined. In view of conservation of the field, the energy integral

$$T = V + h,$$

$$\frac{dR}{dt} = U + h_1$$

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L 21851-66

ACC NR: AP6006900

where h is the energy constant, T the kinetic energy of a unit mass of the particle, V the force function; $U = 4V + 2QV$; $R = r^2$; r is the radius vector; and

$$Q = x\frac{\partial}{\partial x} + y\frac{\partial}{\partial y} + z\frac{\partial}{\partial z}$$

If M is any finite region of space D in which $U > 0$ that does not intersect with the planet, then $h < 0$ is shown to be a necessary condition for stability of orbital motion. It is considered highly probable that $h < 0$ in the entire outer space of a planet of the solar system. If $h \geq 0$, then the particle will either depart to infinity or strike the planet. Orig. art. has: 10 formulas.

SUB CODE: 03, 20/ SUBM DATE: 14Oct64/ ORIG REF: 001/ OTH REF: 001

Card 2/2 nst

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACC NR: AR6027532 SOURCE CODE: UR/0313/66/000/005/0029/0030

AUTHOR: Kholshevnikov, K. V.

TITLE: Zero rank perturbations caused by planetary nonsphericity

SOURCE: Ref. zh. Issledovaniye kosmicheskogo prostranstva, Abs. 5.62.205

REF SOURCE: Byul. In-ta teor. astron. AN SSSR, v. 10, no. 6, 1965, 412-423

TOPIC TAGS: orbit calculation, orbit element, orbit flight path, orbit parameter, orbit perturbation, orbit trajectory, mathematic analysis, satellite, planetary orbit, PERIGEE

ABSTRACT: Basic perturbations in the orbit of a satellite around a nonspherical planet are reviewed. It is shown that zero rank perturbations determining the satellite's orbital behavior over an extended period of time can be found in quadratures. The large semi-axis is lacking in zero rank perturbations, but for inclination i and eccentricity e, the large semi-axis is a restricted, periodic, function of time. For small e, i, these elements are trigonometric functions of time, while $e^2 + i^2 =$ constant. In the general case the perigee has a mean straight-line motion, the node is inverse, and the perigee argument is the mean straight-line motion. When $i \ll e$, or $e \ll i$, perigee and node have identical directional mean motions, and the perigee argument is the periodic time function. For fixed values for the arbitrary constants,

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ACC NR: AR6027532

the partial solutions for e = constant, i = constant, $\omega = \pm \pi/2$, where ω is the longitude of the perihelion, are possible. Bibliography of 20 titles. M. Petrovskaya. [Translation of abstract]

SUB CODE: 22

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

IL'IN, V.K.; VASIL'YEV, V.S. [deceased]; MAYEVSKIY, V.V.; KHOLSHCHEVNIKOV, Ye.N.; KIRKHGOF, A.G.; LOGVINOVICH, S.L.; ABRAMOV, G.A.; MINAYEV-TSIPANOVSKIY, V.A., red.; RACHEVSKAYA, M.I., red.izd-va; VOLKOV, S.V., tekhn.red.

[Laundry equipment album] Al'bom prachechnogo oborudovaniia. Moskva, Izd-vo M-va kommun.khoz.RSFSR, 1958. 119 p. (MIRA 12:7)

1. Akademiya kommunal'nogo khozyaystva. Proyektno-konstruktorskoye byuro.
(Laundry machinery)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACC NR: AP6030924 SOURCE CODE: UR/0207/66/000/004/0074/0084

AUTHOR: Kholshchevnikova, Ye. K. (Moscow)

ORG: none

TITLE: Hall effect on MHD curves of a generator with two pairs of electrodes

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 4, 1966, 74-84

TOPIC TAGS: Hall effect, generator, Hall generator, MHD generator, electrode

ABSTRACT: An attempt has been made to investigate the Hall effect on the MHD curves of a generator with two pairs of electrodes in the case of their symmetrical and cross connections. The following types of electrical connections of electrodes are analyzed: conventional MHD generator with section electrodes, MHD Hall generator, combination type MHD generator, and an MHD Montardi generator. The numerical calculations were carried out with an EVM M-20 computer. Integral characteristics of MHD generators were obtained for various lengths of electrodes and insulators, external loads, and the Hall parameter. The author thanks A. B. Vatazhin and A. N. Krayko for their valuable advice. Orig. art. has: 7 figures and 21 formulas.

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLSHCHEVNIKOVA, YE.K. (Moscow)

"Integral characteristics of the magnetohydrodynamic generator with two pairs of electrodes of finite length".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 January - 5 February 1964.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACCESSION NR: AP4044715 S/0207/64/000/004/0016/0022

AUTHOR: Kholshchevnikova, Ye. K. (Moscow)

TITLE: Integral characteristics of magnetohydrodynamic generator with two pairs of finite length electrodes

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 4, 1964, 16-22

TOPIC TAGS: plasma flow, MHD generator, electrode, ion current, Reynolds number, conducting gas

ABSTRACT: The current distribution in an MHD channel with two pairs of finite length electrodes along its walls separated by isolated sections was calculated. The potential difference between each pair of electrodes may be different. The channel is assumed to extend to infinity in the x direction with width 2δ in the y-direction (see Fig. 1 on the Enclosure). The length of each electrode is l and the insulator 2λ. The magnetic Reynolds number is assumed to be small and all induced currents are neglected. The magnetic field is given by $\bar{B} = (0,0,-B_0)$ and the velocity field, $\bar{V} = [V(y), 0, 0]$, and σ is constant throughout the channel. It is further assumed that the current is symmetric relative to the x-axis, or

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$j_x(x,o) = 0$, and consequently the flow field is mapped from the s-plane onto the γ-plane (see Fig. 1 on the Enclosure) according to the transformation

$$s = -\frac{\lambda+1}{K(k)}\int_0^{\gamma}\frac{d\gamma}{\sqrt{(\gamma^2-1)(k^2\gamma^2-1)}} \qquad \left(k^2+\lambda^2=1;\ s=\sigma+i\rho;\ \gamma=\sigma+i\rho\right)$$

$$\frac{\delta}{\lambda+1}=\frac{K(k')}{K(k)}.$$

The currents I_1 and I_2 are defined by

$$\left(I_1=\int_{-\lambda}^{-1} j_y(x,\delta)\,dx,\ I_2=\int_{1}^{\lambda+1} j_y(x,\delta)\,dx\right),$$

and are obtained in the nondimensional forms

$$I_1^{\circ}=I_1/\sigma E=(\alpha\beta n+2\beta)/\Lambda,\quad I_2^{\circ}=I_2/\sigma E=(\alpha\beta m+2\beta)/\Lambda,$$

where α, β, and Λ are functions of R_1, R_2 σ, δ, λ, and l. Several special cases are considered: 1) l and 2δ fixed and the insulation length approaches zero. I_1 and I_2 then become

$$I_1^{\circ}=\left[m+\frac{\delta}{l}\left(1+\frac{m}{n}\right)\right]^{-1},\qquad I_2^{\circ}=\left[n+\frac{\delta}{l}\left(1+\frac{n}{m}\right)\right]^{-1},$$

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACCESSION NR: AP4044715

2) the effect of external loads on I_1, I_2, and the generator efficiency are studied. It is shown that for a given channel configuration the generator output is maximum when both external loads are the same and equal to $2/\beta$; 3) the effect of channel geometry on I_1, I_2, and η are considered next. All three are seen to increase for an increase in l/δ with a fixed λ/δ. On the other hand, by increasing λ/δ with a fixed l/δ, the internal resistivity of the system decreases. "The author is grateful to A. B. Vatazhin for handling the mathematics and helping in the work." Orig. art. has: 22 formulas and 6 figures.

ASSOCIATION: none

SUBMITTED: 07Mar64 ENCL: 01

SUB CODE: ME NO REF SOV: 009 OTHER: 000

Card 3/4

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACCESSION NR: AP4044715

ENCLOSURE: 01

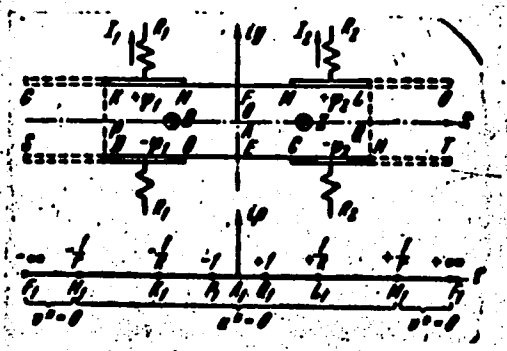

Fig. 1.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOL'SHEVA, A. F.

А. Ф. [illegible]

Схема [illegible] на магнитных [illegible].

И. И. [illegible],
Л. С. [illegible],
М. А. [illegible]

Магнитное оперативное запоминающее устройство с магнитным управлением.

Я. В. [illegible],
И. Г. [illegible],
Г. И. [illegible]

Десятичный [illegible] преобразователь на магнитных элементах с [illegible] ферритовым запоминающим устройством.

И. В. [illegible]

Многодорожечная запись [illegible] на магнитной ленте.

12 июня
(с 10 до 16 часов)

М. А. [illegible],
И. Н. [illegible]

Принципы построения опытной ферритовой вычислительной машины.

66

Ю. А. [illegible],
В. И. [illegible]

Арифметическое устройство ферритовой цифровой машины.

Ю. А. [illegible]

Внешнее устройство ферритовой малогабаритной цифровой машины ЛЭМ-1.

Г. И. [illegible]

О контроле операций в вычислительной машине ЛЭМ-1.

12 июня
(с 18 до 22 часов)

В. В. [illegible]

Подготовка информации для программного управления металлорежущими станками.

Д. Д. [illegible]

Некоторые вопросы использования электронных вычислительных машин в системах связи

Г. И. [illegible]

Опыт решения задачи по определению плотности энергетических уровней электронов в кристалле на машине ЛЭМ-1.

67

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June. 1959

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

16.8000

S/044/60/000/003/010/012
C111/C222

AUTHORS: Gutenmakher, L.I., Avrukh, M.L., Vissonova, I.A., Mokhel', L.L. and Khol'sheva, A.F.

TITLE: Magnetic devices free of contacts for control systems

PERIODICAL: Referativnyy zhurnal. Matematika, no.3, 1960, 170, abstract 3556. (Avtomat. upravleniye i vychisl. tekhn. M., Mashgiz, 1958, 113-145)

TEXT: The authors describe assemblies and blocks of a number of devices using ferrite and oksifer cores which were designed in the laboratoriya elektromodelirovaniya AN SSSR (laboratory for electrical modeling of the Academy of Sciences USSR) as well as a long-term storage device with condensers. The authors give data on an operating mock-up of a computer with magnetic units and a long-term operative capacity and magnetic storage device with a magnetic control for 1024 numbers and the velocity of recording and reading of 10 microseconds.

[Abstracter's note: Complete translation.]

Card 1/1

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLSHEVNIKOV, K.V.

Secular perturbations of higher orders caused by the flattening of a planet. Uch. Zap. LGU no.323:192-207 '64.

(MIRA 17:12)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLSHEVNIKOV, K.V.

Value of the coefficients of expansion of the potential. Vest. LGU 20 no.13:155-158 '65. (MIRA 18:7)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

NIKOL'SKIY, Georgiy Danilovich; KHOLSHEVNIKOVA, Ye.V., red.; ONOSHKO, N.G., tekhn.red.

[Pigeons] Golubi. Izd.2. Leningdat, 1959. 41 p. (MIRA 12:6)
(Pigeons)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

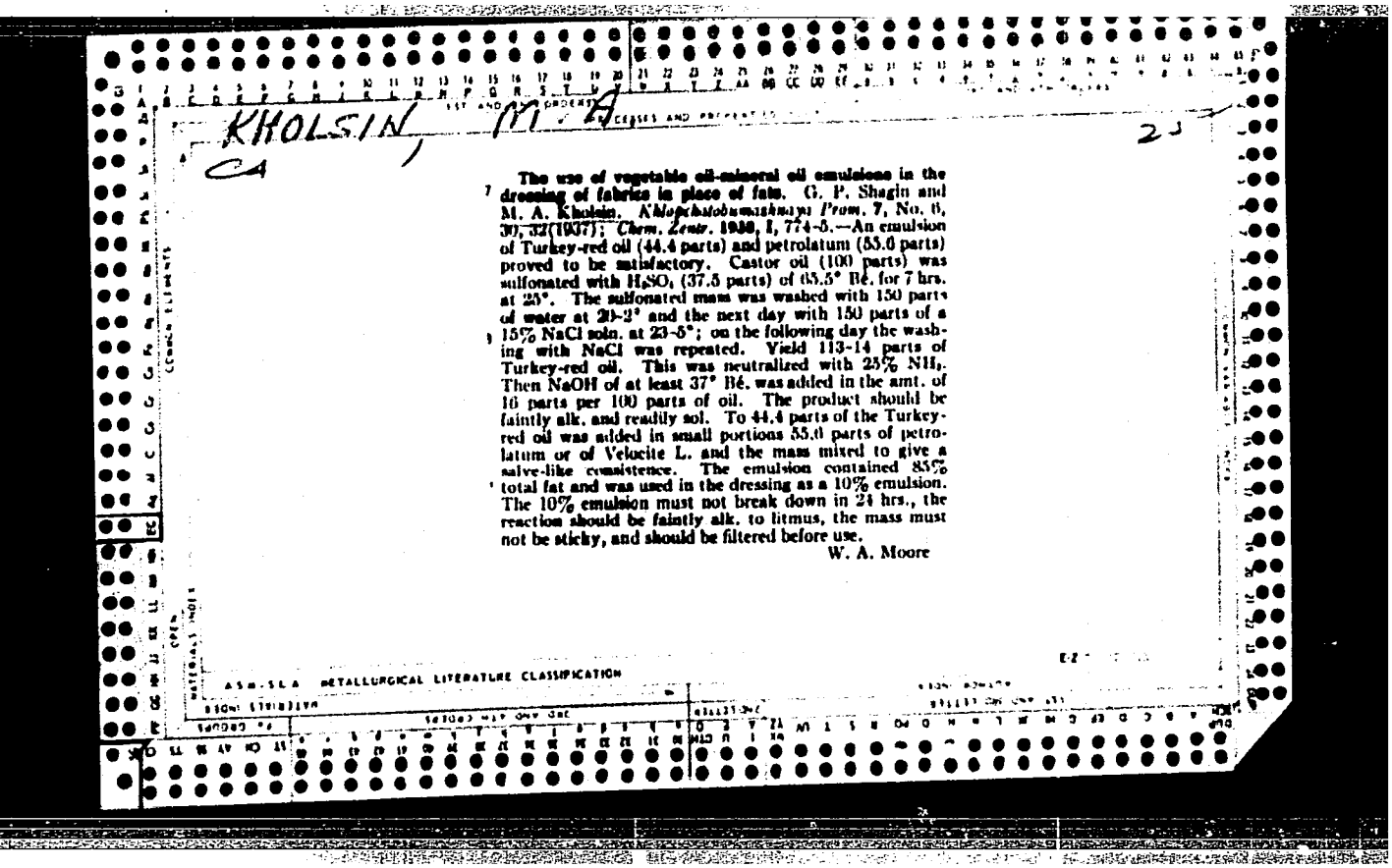
"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

PALIN, A.I.; LISITSKIY, R.M.; KHOLSHTEYN, R.Ya.; KLIMOVICH, T.P., otv. red.; SEMILETOVA, A.P., otv. red.; GERSHTEYN, G.Ye., red.

[Handbook on prepared drugs] Spravochnik po gotovym lekarstvennym formam. Sost. A.I.Palin, R.M.Lisitskii, R.IA. Kholshtein. Otv. red. T.P.Klimovich, A.P.Semiletova. Riga, Glav. aptechnoe upr. M-va zdravookhraneniia Latviiskoi SSR, 1962. 390 p. (MIRA 16:11)
(Pharmacy--Handbooks, manuals, etc.)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5



KHOLSIN, M. A.

CA

21

The use of vegetable oil-mineral oil emulsions in the dressing of fabrics in place of fats. G. P. Shagin and M. A. Kholsin. *Khlopchatobumazhnaya Prom.* 7, No. 6, 30, 32(1937); *Chem. Zentr.* 1938, I, 774-5.—An emulsion of Turkey-red oil (44.4 parts) and petrolatum (55.6 parts) proved to be satisfactory. Castor oil (100 parts) was sulfonated with H_2SO_4 (37.5 parts) of 65.5° Bé. for 7 hrs. at 25°. The sulfonated mass was washed with 150 parts of water at 20-2° and the next day with 150 parts of a 15% NaCl soln. at 23-5°; on the following day the washing with NaCl was repeated. Yield 113-14 parts of Turkey-red oil. This was neutralized with 25% NH_4. Then NaOH of at least 37° Bé. was added in the amt. of 16 parts per 100 parts of oil. The product should be faintly alk. and readily sol. To 44.4 parts of the Turkey-red oil was added in small portions 55.6 parts of petrolatum or of Velocite L. and the mass mixed to give a salve-like consistence. The emulsion contained 85% total fat and was used in the dressing as a 10% emulsion. The 10% emulsion must not break down in 24 hrs., the reaction should be faintly alk. to litmus, the mass must not be sticky, and should be filtered before use.

W. A. Moore

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLSTOV, A.V.

Initiative of communication men. Vest.sviazi 18 no.1:27 Ja '58.
(MIRA 11:1)

(Telecommunication)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

Kholtanskikh, B. Yu. B.

1420 AEC-tr-2695

THE USE OF A POLAROGRAPH [illegible]
RECORDING OF POLARIZATION CURVES [illegible]
SALTS. [illegible]
G. F. Vasilenko Translated from [illegible]
1672-5(1955)

It is concluded that the commutator method [illegible] to the direct compensation method in the use of a polarograph for automatic recording of polarization curves in fused salts. (T.R.H.)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

36069
S/079/62/032/004/010/010
D287/D301

11.2773

AUTHORS: Khol'tsapfel, Kh., and Rikhter, K.

TITLE: Synthesis of sodium tetraphenylboron in tetrahydrofuran

PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 4, 1962, 1358-1359

TEXT: The authors prepared the title compound by using the method described by Nesmeyanov (Ref. 2: Izv. AN SSSR, OKhN, 1955, 187) with the difference that they used tetrahydrofuran distilled over Na instead of the crude solvent. The Grignard reagent (prepared from 27g Mg and 160 g bromobenzene in 260 ml absolute tetrahydrofuran) was treated with 27 g dry $NaBF_4$, raising the temperature to 72°C and agitating the mixture for 2 hours on a water bath at 75°C. The mixture was then cooled to 25°C and 200 ml of a saturated solution of NaCl added dropwise; the temperature was kept at 60°C. After separating the yellow layer of tetrahydrofuran the viscous, aqueous bottom layer was re-extracted from 100 ml tetrahydrofuran. The latter was then separated on a water bath, the residue dissolved in

Card 1/2

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water, filtered, and treated in the usual manner. The pure sodium tetraphenylsodium was obtained in 27.4 % yield (calculated on $NaBF_4$) This direct reaction between C_6H_5MgBr and $NaBF_4$ refutes data obtained by Kh.R. Kozlova and V.A. Pal'm (Ref. 1: Zhurnal obshchey khimii, v. 31, 1961, 2922) although the authors obtained a lower yield of the title compound. There are 2 Soviet-bloc references.

ASSOCIATION: Institut neorganicheskoy khimii universiteta im. K. Marksa, Leyptsig (Institute for Inorganic Chemistry of the University im. K. Marx, Leipzig)

SUBMITTED: December 16, 1961

Card 2/2

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOL'TSBEKHER, Kristian [Holzbecher, Kristian], inzh.; FORER, I.B., red.; RASTOVA, G.V., ved. red.; VORONOVA, V.V., tekhn. red.

[Economical methods for burning gas in industry] Ekonomichnye metody szhiganiia gaza v promyshlennosti. Moskva, Gostoptekhizdat, 1964. 110 p. Translated from the Czech. (MIRA 17:4)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

PIKHLER, G.; KHOL'TSER, Y.; UL'RIKH, R.; FREYDORFER, K.; PETTS, E.

Unforgettable impressions. Avt.transp. 40 no.9:12-13 S '62. (MIRA 15:9)

(Austria--Relations (General) with Russia)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

RABUKHIN, A.Ye., professor; MASSEN, N.I.; KHOL'TSMAN, A.S. (Moskva)

Significance of Mycobacterium tuberculosis resistance to medicine in the treatment of pulmonary tuberculosis. Klin.med. 33 no.12: 13-18 D '55. (MLRA 9:5)

1. Iz bol'nitsy "Vysokiye Gory" Mosgorzdravotdela (glavnyy vrach V.G.Semachatov) i kafedry tuberkuleza TSentral'nogo instituta usovershenstvovaniya vrachey (dir. V.P.Lebedeva)
(TUBERCULOSIS) (MYCOBACTERIUM TUBERCULOSIS)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLTSMAN, KELIN

RUMANIA / Chemical Technology. Fats, Oils, Waxes, Soaps, Detergents, Flotoreagent H-25

Abs Jour : Ref. Zhur-Khimiya, No 12, 1958, 41188.

Author : Khol'tsman, Kelin

Inst : Not given

Title : Evaluation of the practical value of surface active agents.

Orig Pub : Standardizarea, 1957, 9, No 11, 528-535

Abstract : A short description is given for the methods widely used for determining physical-chemical properties of surface active agents: the wetting power, foaming, washing, and emulsifying properties, solubility, stability in hard water, and their efficiency in various fields of industry. Thirty-three library references are given.

Card 1/1

12

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLTSMANIS, A.V. [Holcmanis, A.], otv. red.; TILMANIS, O.F., kand. arkh., red.; BAZHANOVA, S., red.; BOKMAN, R., tekhn. red.

[City planning and housing construction in the Latvian S.S.R.] Gradostroitel'stvo i zhilishchnoe stroitel'stvo v Latviiskoi SSR; sbornik statei. Riga, Izd-vo Akad. nauk Latviiskoi SSR, 1962. 201 p. (MIRA 16:5)

1. Latvijas Padomju Socialistiskas Republikas Zinatnu Akademija. 2. Chlen-korrespondent Akademii stroitel'stva i arkhitektury SSSR (for Tilmanis). (Latvia--City planning)
(Latvia--Apartment houses--Design and construction)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLTURIN, Fedor Nikolayevich, voyennyy zhurnalist; MARIINSKIY, Ye., red.

[Along a bright trail] Po svetlomu sledu. Moskva, Molodaia gvardiia, 1964. 126 p. (MIRA 17:12)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUPKO, B.M.

The BU2-600 lightened boring unit. Biul.tekh.-ekon.inform.Gos.-nauch.-issl.inst.nauch.i tekh.inform. no.11:21-23 '62. (MIRA 15:11)
(Boring machinery)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUPYAK, K., kand.sel'skokhozyaystvennykh nauk

Conference on soil erosion control in the Ukraine. Zemledelie 25 no.2:87-88 F '63. (MIRA 16:5)

1. Ukrainskiy nauchno-issledovatel'skiy institut pochvovedeniya imeni A.N.Sokolovskogo.
(Ukraine--Soil conservation--Congresses)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

1. KHOLUPYAK, K. L.: CHERNYSHEV, A. A.
2. USSR (600)
4. Surveying - Instruments
7. Device for determining steepness of slopes. Les i step' 4 no. 12, 1952.

9. Monthly List of Russian Accessions, Library of Congress, March 1953, Uncl.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUPYAK, K. L.

Soil Conservation

Soil erosion and means of controlling it. Sov. agron. 10 no. 5, 1952.

Monthly List of Russian Accessions, Library of Congress, July 1952. Unclassified.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLMYAK, K. L. Mar 55

USSR/Geophysics - Erosion

"Gulleys and Shifting of River Beds," K. L. Kholmyak, Cand Agricultural Econ Sci, Ukrain Sci-Res Inst of Forestry and Forest Soil Improvement (Khar'kov)

Priroda, No 3, pp 105-108

Discusses relation between horizontal shifting of river beds and gulley erosion as observed along Desna River bank from Novgorod-Seversk to its estuary, and the typical gulley-ravine systems which flow directly into the bottom land.

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUPYAK, K. L.

USSR/ Biology-Botany

Card : 1/1

Authors : Kholupyak, K. L. Cand. of Agricultural Sciences

Title : Tree plants in fight with ravines

Periodical : Priroda, 6, 97 - 101, June 1954

Abstract : The subject of this report is soil erosion and the fight of tree plants with ravines caused by soil erosion. Illustrations.

Institution : The Ukrainian Institute of forestry and Melioration

Submitted : ....

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

USSR / Forestry. Forest Crops. K-3

Abs Jour: Ref Zhur-Biol., No 6, 1958, 24916.

Author : Kholupyak, K. L.
Inst : Not given.
Title : Sea Buck Thorn - A Valuable Shrubbery for the Afforestation of Ravines.

Orig Pub: Byul. nauchno-tekhn. inform. Ukr. n.-i. in-t lesn. kh-va i agrolesomelior., 1957, No 3-4, 43-46.

Abstract: No abstract.

Card 1/1

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUPYAK, K.L., kand.sel'skokhozyaystvennykh nauk

Sea buckthorn is a valuable shrub for controlling ravines.
Zemledelie 6 no.9:56-59 S '58. (MIRA 11:9)
(Buckthorn) (Soil binding)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUPYAK, Konstantin Leont'yevich [Kholup'iak, K.L.], kand. sel'khoz. nauk; BARANOVSKIY, D.I.[Baranovs'kyi, D.I.], dots., red.; VASKOVSKIY, Yu.I.[Vas'kovs'kyi, IU.I.], red.

[More effective forest plantations for erosion control] Pidvyshchennia efektyvnosti protyeroziinykh lisovykh nasadzhen'. Kyiv, Vyd-vo Ukrains'koi Akad. sil's'kohospodars'kykh nauk, 1961. 153 p. (MIRA 15:3)
(Erosion control) (Windbreaks, shelterbelts, etc.)

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

Country : USSR
Category : Forestry. Forest Management. K

Abs Jour : RZhBiol., No 6, 1959, No 24728

Author : Kholupyak, K. O.
Inst : -
Title : Forest-Restoration Operations on the Carpathian Mountain Slopes.

Orig Pub : Lesn. kh-vo, 1958, No. 7, 27-30

Abstract : The status of the forest tree-fellings and its restoration in a number of forestries in the Carpathians is examined. The categoric impossibility of using massive fellings under the conditions of the Carpathian Mountain forests and the very slight effectiveness of restoring the forest by cultivations in places of its total deestruction are underscored.

Card : 1/2

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Card : 2/2

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUYANOV, G. F.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUYANOV G. F.

15(0) 24(6) PHASE I BOOK EXPLOITATION SOV/1529

Leningrad. Elektrotekhnicheskiy institut

Nauchnaya literatura po dielektrikam i poluprovodnikam; bibliografiya 1953-1955 (Scientific Literature on Dielectrics and Semiconductors; a Bibliography of Literature Published from 1953 to 1955) Leningrad, Leningr. elektrotekhn. in-t im. V.I. Ul'yanova (Lenina), 1957. 146 p. 1,500 copies printed.

Resp. Ed.: G.F. Kholuyanov, Candidate of Technical Sciences; Compiler: A.N. Gruzdeva, Bibliographer.

PURPOSE: This bibliographical list is intended for instructors of vtuzes, scientists and engineers, and students taking advanced courses in dielectrics and semiconductors. Its aim is to acquaint the reader with the scientific periodical literature of the last few years.

COVERAGE: This booklet is a supplement to the bibliographical index "Scientific Works on Dielectrics" (1930-1950) and "Scientific Literature on Semiconductors" (1920-1952). It includes literature on dielectrics and semiconductors published in both the Soviet Union and abroad from 1953 through 1955. It was compiled under the direction of the Department of Dielectrics and Semiconductors, Leningrad Electrotechnical Institute (Professor N.P. Bogoroditskiy, Doctor of Technical Sciences, head of department). The list contains more than 2000 publications on dielectrics and semiconductors and their uses.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

81355

S/181/60/002/03/09/028
B006/B017

24.7700

AUTHORS: Kharlamova, T. Ye., Kholuyanov, G. F.

TITLE: Electrical Properties of Melt p-n Junctions in Silicon Carbide

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 426-433

TEXT: The light-green α-SiC single crystals (n-type) which were necessary for the investigations were supplied by the Zaporozhskiy karborundovyy zavod (Zaporozh'ye Carborundum Works); the resistivity of the crystals was 2 - 2.5 ohm.cm. The production of the element with which the investigations were carried out is described at the beginning. It is schematically shown in Fig. 1. It consisted of several layers of varying diameters of W, Si + WC, n-type SiC, p-type SiC, and Si-Al alloy which fused in hydrogen atmosphere. The current-voltage characteristics of these elements (Figs. 2 - 5) were recorded in the temperature range 20 - 500°C. For the p-n junction, the saturation current was calculated

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

Electrical Properties of Melt p-n Junctions in Silicon Carbide

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B006/B017

from the formula $I_s = Se \frac{D_p N_c N_v}{L_p n_n} \exp(-E_g/kT)$, where S is the p-n junction area (in the samples investigated 0.011 and 0.018 cm^2), D_p, the hole diffusion coefficient, was assumed to be 0.25 cm^2/sec and the electronic mobility n_n to be 100 cm^2/sec.v. The width of the forbidden zone E_g was 2.86 ev. The time constant of the decrease in recombination luminescence for both samples was between 1 and 0.2 μsec, so that with a hole diffusion length between 5 and 0.5 mμ and at 20°C the saturation currents were computed to be between 10^{-38} and 10^{-37}a. On the basis of measurements of the dependence of the intensity of recombination luminescence on the voltage, the rules governing the increase of the current component due to diffusion with increasing voltage were investigated. For the direct direction in sample 1 it is found that the diffusion component increases proportionally to $\exp(eV_1/1.4\ kT)$, in sample 2 proportionally to $\exp(eV_1/3kT)$. In these investigations the voltages were below 2.5 v. In the following, a report is given on investigations of the influence exercised by defects and current leakage in p-n junctions on current-

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

Electrical Properties of Melt p-n Junctions in Silicon Carbide

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B006/B017

voltage characteristics. In the entire voltage range investigated the reverse current increased with increasing voltage more rapidly than linearly. In the range of strong reverse currents phenomena were observed, which indicated the avalanche-like character of the discharge at the periphery of the p-n junction and in the region of the defects. Finally, capacitance measurements of p-n junctions and their voltage and temperature dependences are described. A possibility of using p-n junctions in silicon carbide as nonlinear condensers is discussed. In conclusion, the authors thank Professor N. P. Bogoroditskiy and V. V. Pasynkov for their interest, as well as E. A. Violin and F. G. Tomashpol'skiy, students of LETI, for their assistance in the experiments. O. V. Losev is mentioned. There are 6 figures and 14 references: 3 Soviet, 7 US, 2 German, and 1 Swiss.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin))

SUBMITTED: June 4, 1959

Card 3/3

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

81356
S/181/60/002/03/10/028
B006/B017

9.2100

AUTHORS: Pasynkov, V. V., Kholuyanov, G. F., Chirkin, L. K.

TITLE: Dynamic Current-voltage Characteristics of Silicon Carbide Resistors

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 434-437

TEXT: In recent times, the number of low-voltage nonlinear silicon carbide resistors has widely increased; the maximum current densities in these apparatus do not exceed 1 - 2 a/cm^2. Basing on the same principle the authors produced resistors from green and black silicon carbide, and investigated their dynamic current-voltage characteristics at low current densities by means of an apparatus the circuit of which is shown in Fig. 2. The current-voltage characteristics show essential deviations from the ordinary ones (Fig. 1). Figs. 3a and 3b show typical dynamic characteristics of resistors of green silicon carbide (sample thickness: 1.5 mm, area: 75 mm^2; natural capacitance: 30 pf). The oscillograms were recorded with pulse durations of 30 and 20 μsec (pulse

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Dynamic Current-voltage Characteristics of Silicon Carbide Resistors

S/181/60/002/03/10/028
B006/B017

height: 138 v). The hysteresis of the characteristics is a result of the natural capacitance of the nonlinear resistor. The succession of the branches of the hysteresis loop was determined by charging and discharging the capacitance of the samples. The hysteresis loop in the initial part of the current-voltage characteristic widened with increasing steepness of the pulse fronts. At low current densities, the microheatings of the contacts between the crystals had no essential influence on the nonlinearity of the resistors. With increasing voltage the resistance of the samples decreases, the influence of natural capacitance decreases as well, and the dynamic current-voltage characteristic approaches the static one. The capacitance of the nonlinear resistors of black and green silicon carbide does not vary within the frequency range 50 kc/s - 25 Mc/s. The dielectric constant of a non-homogeneous resistor material raises the natural dielectric constant of silicon carbide considerably. This phenomenon is connected with the presence of polarizations within the layers of a non-homogeneous material. The capacitance of the nonlinear resistors does not depend on the constant displacement voltages. There are 4 figures and 6 references:

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Leningrad Electrotech Inst.

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83013
S/181/60/002/008/032/045
B006/B063

24.2600

AUTHOR: Kholuyanov, G. F.

TITLE: The Photoelectric Properties of Molten p-n Junctions in Silicon Carbide

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 8, pp. 1909 - 1914

TEXT: The paper of Ref. 3 deals with the possibility of producing p-n junctions in n-type silicon carbide by melting, and the electrical properties of these p-n junctions were studied in the paper of Ref. 4. The present article gives the results of an experimental study of the photoelectric properties of p-n junctions of an α-modification of silicon carbide (resistivity: 5 - 20 ohm.cm). The specimen was illuminated from the side of the hole-type region of the junction by means of a 25-watt hydrogen lamp. Among other things, a photoelectro-optical multiplier of the type ФЭУ-18 (FEOU-18) designed by Professor B. P. Kozyrev was used for the experimental arrangement. At room temperature, the maxima of the spectral sensitivity of the greater part of the p-n junctions investigated were found to lie in the quantum energy range of 4.3 - 4.5 ev.

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83013
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B006/B063

The Photoelectric Properties of Molten p-n Junctions in Silicon Carbide

Fig. 1 shows a spectral characteristic of three specimens at 293°K, and Fig. 2 shows the characteristics obtained for the same specimen at different temperatures. With a rise in temperature, the curves are shifted toward lower quantum energies. Within the long-wave region, this shift is almost linear. On the average, it is $5 \cdot 10^4$ ev/deg and varies from specimen to specimen within ±30%. The short-circuit currents increase linearly with the intensity of illumination. Fig. 3 shows the short-circuit current density as a function of the intensity of illumination for the three specimens, the characteristics of which are shown in Fig. 1. The three specimens, A, B, and C, had a sensitivity of $1.65 \cdot 10^4$, $2.45 \cdot 10^4$, and $2.92 \cdot 10^4$ μa/w for junction areas of 1.65, 1.86, and 2.16 mm^2. Fig. 4 shows the photo-emf as a function of the intensity of illumination at room temperature: In the case of low intensities, the photo-emf is almost linearly dependent on the intensity. The temperature dependence of the short-circuit current density and photo-emf is shown in Fig. 5. The author also studied p-n junctions in α-SiC which were sensitive to ultraviolet light. Their sensitivity had a maximum at 20°C for 4.3 - 4.5 ev.

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The Photoelectric Properties of Molten p-n Junctions in Silicon Carbide

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B006/B063

With a rise in temperature, these characteristics were shifted toward lower quantum energies. This corresponds to the narrowing down of the forbidden band. When the above p-n junction was illuminated with a mercury lamp at 20°C, its maximum integral sensitivity was $3 \cdot 10^4$ μa/w. This value increased with a rise in temperature. At room temperature, the hole lifetime was not longer than 1μ sec. The electron mobility determined from the measured value of the Hall effect was not higher than 100 cm^2/v.sec. For an electron lifetime of about 1μ sec in the p-type region, the author obtained an electron diffusion length of about 2μ. He thanks Professor B. P. Kozyrev for the valuable advice he gave him for the radiation measurement, as well as Engineer T. Ye. Kharlamova and G. N. Porozhnikova and A. V. Oparina, students of LETI, for their assistance in this work. There are 5 figures and 5 references: 1 Soviet, 3 US, and 1 German.

ASSOCIATION: Leningradskiy Elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin))

SUBMITTED: January 18, 1960

Card 3/3

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

S/058/61/000/005/034/050
A001/A101

24,7800 (1136, 1145, 1153)

AUTHORS: Kholuyanov, G.F., Kharlamova, T.Ye.

TITLE: Properties of p - n transitions in silicon carbide

PERIODICAL: Referativnyy zhurnal. Fizika, no 5, 1961, 292, abstract 5E428 ("Izv. Leningr. elektrotekhn. in-ta", 1960, no 43, 141 - 149)

TEXT: The authors investigated electric properties of molten-in p - n transitions in SiC. Voltampere and capacitance characteristics were measured in the temperature range from room temperature to 500°C (at heating up to 600°C an irreversible increase of reverse current through the transition was observed). The maximum current density of ~90 amp/cm^2 was determined for specimens investigated. The voltampere curves in the back direction have the appearance (in semilogarithmic scale) of a broken line composed of three straight sections with increasing slope. The positions of the deflection points relative to the axis of stresses depends on temperature insignificantly. The experimental data obtained can not be explained with the aid of the simple diode theory. It is assumed that leakage currents play an essential part in transitions from SiC, and the current through the transition in the back direction is determined by them entirely. The

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

Properties of p-n transitions in silicon carbide

S/058/61/000/005/034/050
A001/A101

form of dependence of the diffusion component of direct current was determined from the voltage dependence of intensity of the yellow-green luminescence in the transition. The results obtained agree well with the estimate of diffusion length of holes, made on the basis of measuring the time constant of luminescence fading. It is assumed that the non-linear growth of reverse current through the transition is, already at low voltages, connected with ionization by the electric field of impurities which are still available in the given temperature range. Electric field intensity, estimated from capacitance measurements, turn-out to be 10^6 v/cm. Apparently, near various defects of the lattice field intensity is considerably higher. At high voltages at the transition, the growth of current is due to cascade spark-over. Investigations of capacitance characteristics of transitions from SiC have shown that the capacitance of the transition did not practically change with frequency with the range from 0.1 to 75 kc and increased with the temperature rise. It is presumed that p - n transitions from SiC can be utilized as non-linear capacitors in the mode withcut bias in the back direction.

V. Pokalyakin

[Abstracter's note: Complete translation.]

Card 2/2

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28086
S/181/61/003/009/020/039
B102/B104

24.3500 (1137, 1138)

AUTHORS: Tomashpol'skiy, F. G., and Kholuyanov, G. F.

TITLE: Spectra of recombination radiation in molten SiC p-n junctions

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2688 - 2693

TEXT: When studying SiC detectors O. V. Losev found that on carrier injection luminescence occurs which he termed "luminescence II". Later on this effect was studied several times and explained as recombination luminescence (electron - hole recombination). The spectrum of this luminescence was again studied in n-type α-SiC (resistivity 0.1 - 2 ohm.cm) under more favorable conditions. SiC platelets were polished, ground, and etched in parallel to the natural face ⟨0001⟩, and contacts (Al + 50% Si and Si + 1-2% P) were molten to it. The specimens to be measured were located in the focus of an elliptic aluminum-coated mirror in a cryostat. The light reflected from the mirror passed through a monochromator ЗМП -3 (ZMP-3) and reached the ФЭУ -18(FEU-18) and ФЭУ -22(FEU-22) photomulti-

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Spectra of recombination...

pliers which cover a quantum energy range of from 1.2 to 6 ev. Resolution was not poorer than 0.03 ev at 1.2 - 2.0 ev and not poorer than 0.006 ev at higher quantum energies. The current pulses passing through the specimen had a pulse repetition frequency of 37 cps. The spectra were recorded in the form of the energy dependence of the number of photons emitted per unit time and energy interval. The spectrum at 130°K was characterized by two maxima (the first between 1.7 and 1.9 ev, the second between 2.55 and 2.65 ev). In the range of higher quantum energies the position of the curve depended on the current densities. Also temperature changes influenced above all the short-range part of the spectrum. At increased temperatures the recombination radiation proper produces a strong effect. This effect increases with increasing temperature and increasing current. At low temperatures the structureless exponential decrease of the spectrum (Fermi edge) is well distinct. The forbidden band width of the specimens was at 2.87 and 2.89 ev. The Fermi level was by 0.12 - 0.15 ev below the bottom of the conduction band. It is concluded from the fact that the short-wave edge of the spectrum was at energies almost equal to those of the forbidden-band width, that radiation is related to the ex-

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Spectra of recombination...

istence of donars. An analysis of the results indicated the probability that the Fermi edge of the spectrum is determined by a degeneracy of usual donor centers. The results of capacitance measurements of the junctions were used to estimate the donor concentration with a value of $\sim 5 \cdot 10^{18}$ cm^{-3} being obtained. The authors thank LETI student M. Lizets for help. There are 3 figures and 12 references: 3 Soviet and 9 non-Soviet. The four most recent references to English-language publications read as follows: R. N. Hall, J. Appl. Phys. 29, 914, 1959; H. C. Chang. Semiconductor Prod., 3, 29, 1960; C. A. A. J. Greebe, W. F. Knippenberg. Phil. Res. Repts., 15, 120, 1960; L. Patrick, W. J. Choyke. J. Appl. Phys., 30, 236, 1959.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin))

SUBMITTED: April 13, 1961

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30776
S/181/61/003/011/009/056
B102/B138

24.7000 (1136, 1143, 1144)

AUTHOR: Kholuyanov, G. F.

TITLE: Radiation during breakdown of siliconcarbide p-n junctions

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3314-3316

TEXT: Light emission during breakdown of SiC p-n junction was first observed by O. V. Losev (Phil. Mag. 6, 1024, 1928), D. Rücker (Z. f. ang. Phys., 10, 250, 1958) has studied the spectrum in the range 2 - 3.1 ev. The author of the present paper studied the spectra in a broader range. The p-n junctions investigated were produced by melting an Al-Si alloy into n-type α-SiC. The resistivity of the materials was between 0.1 and 10 ohm·cm. The radiation emitted from the p-type side of the junction was recorded by a system consisting of a monochromator, ФЭУ-18 (FEU-18) and ФЭУ-22 (FEU-22) photomultipliers and a 0.025 cps pass band amplifier in synchronous-detection circuit. The amplifier had an operating frequency of 37 cps. To avoid the samples getting heated the current was supplied as 5 - 10 μsec long pulses with a repetition frequency of 400-1000 cps. The resolution of the system was not worse than 0.03 ev between 1.2 and

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Radiation during breakdown of ...

2.0 ev and not worse than 0.006 ev at higher energies. The spectra were plotted with the relative numbers of photons per unit time and per unit energy interval as functions of the photon energy. Such a spectrum is shown in Fig. 1. Radiation intensity increased with increasing voltage, at first rapidly, upto about 20 v, then more slowly. An investigation of the avalanche breakdown in the 1.05 - 3.5 ev range showed that there are hot electrons with kinetic energies $E \geqslant 4$ ev; thus for α-SiC $E_g + E_n$ should be not less than 6.8 - 6.9 ev (E_g - forbidden band width, E_n - kinetic electron energy necessary for impact ionization). The fact that the number of short-waved photons increases with increasing voltage is due to an increase of the field strength in the sparkover channels. The radiation spectrum depends on the energy distribution function of the hot carriers, which, for $E < E_n$ is proportional to $\exp(-E/b\varepsilon)$. E is the kinetic energy of electrons, ε the field strength and b depends on the carrier scattering mechanism. Due to the high impurity concentration of $\sim 10^{18} cm^{-3}$ scattering from impurities may play a considerable part in the specimens investigated. For constant current intensity the spectrum does

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

not change with temperature. The author thanks F. G. Tomashpol'skiy for assistance and discussions. There are 2 figures and 8 references: 3 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: L. Patrick, W. J. Choyke. Phys. Rev. Lett., 2, 48, 1959; R. Newman. Phys. Rev., 100, 700, 1955; A. G. Chynoweth, K. G. McKay. Phys. Rev., 102, 369, 1956; P. A. Wolff. Phys. Rev., 95, 1415; 1954.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin))

SUBMITTED: May 19, 1961

Fig. 1. Energy spectrum of quantum emission during breakdown. (1) voltage pulse heights of 19 v, current pulse heights of 12.5 ma; (2) - of 50 v and 130 ma, resp.; (3) recombination radiation spectrum at 20°C and 1.5 a/cm^2.

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32080
S/181/61/003/012/015/028
B104/B102

24,7700 (1035, 1138)

AUTHORS: Porozhnikova, G. N., and Kholuyanov, G. F.

TITLE: Photoconductivity of the α-modification of silicon carbide

PERIODICAL: Fizika tverdogo tela, v. 3, no. 12, 1961, 3657 - 3662

TEXT: The photoconductivity spectrum of n-type α-SiC from 1 to 5 ev was measured between 100 and 500°K, using crystals without visible inclusions. Faces parallel to <0001> were ground and polished. The faces of plate-shaped specimens grown in a furnace, which were parallel to <0001>, were not mechanically processed. These faces were optically smooth. Two types of contacts were used: A) Low-resistance silicon alloyed with phosphorus was applied at 1500°C, whereupon an Au-Sb alloy was melted. B) nickel films were applied at 1450°C in a hydrogen atmosphere onto SiC crystals. The specimens could then be etched with Na_2O_2 melts. Both these types had linear volt-ampere characteristics. No photoeffect was observed when the contacts were not connected to a voltage source. The 700-w xenon high-pressure tube used to record photoconduction spectra had a continuous

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Photoconductivity of the ...

spectrum in the range of interest. The tube was located at the focal point of an elliptic reflector focusing the beam onto the slit of a ЗМР-3 (ZMR-3) monochromator with quartz optics. The beam was modulated at 37 cps. The resolution in the measurement of photoconductivity varied from 0.02 to 0.006 ev in the range of 2.8 - 5 ev, and from 0.04 to 0.02 ev in the range of 1 - 2.8 ev. The specimens were placed within a cryostat. The instrument was calibrated with a radiation thermocouple. Optical absorption was investigated with the specimen being placed at the focal point of the reflector. ФЭУ-22 (FEU-22) and ФЭУ -18 (FEU-18) photomultipliers were installed at the output of the monochromator. The photoconductivity spectra were compared with the absorption spectra. It could be shown that the coefficient of light absorption by free carriers is not proportional either to the carrier concentration or to E_{ν}^{-2} (E_{ν} - photon energy). The differences observed between the photoconductivity and absorption spectra are possibly due to donor-acceptor impurity associations. Etching by Na_2O_2 and oxidation affected the short-wave range of the photosensitivity spectrum of specimens with the highest photosensitivity. The ratios of

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43118
S/181/62/004/011/017/049
B104/B102

24.7600

AUTHOR: Kholuyanov, G. F.

TITLE: The relaxation of photoconductivity and carrier lifetime of SiC

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3170 - 3176

TEXT: In order to study the recombination of the majority and minority carriers in n and p-type α-SiC the relaxations of the photoconductivity, of the photomagnetic effect, and of the stationary photoconductivity were investigated as well as the electroluminiscence. The samples were obtained by sublimation. The p-type crystals were of high resistivity (90,000 ohm·cm at 20°C) and had impurities of Al, Fe, Mg, Cu, Mn, and Ti. The thermal activation energy was ∿0.28 ev, a value which corresponds to Al acceptors. Nitrogen was added to the n-type crystals during their growth. Their resistivity lay between 0.2 and 10 ohms·cm at 20°C; and the thermal activation energy was ∿0.082 ev which is characteristic of samples with nitrogen content. Plates cut out by an ultrasound cutter were polished to the required thickness and etched for 15 - 20 minutes with Na_2O_2 or

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The relaxation of photoconductivity...

$4KNO_3$ + NaOH fusions. Linear contacts which produce no photo-emf were obtained by the fusion of gold with 30 atom% of Ta on the n-type samples, or by gold with 30 atom% Ta and 10 atom% Al on the p-type samples. The relaxation of photoconductivity excited by light pulses was investigated in the region of 85 - 700°C. The photosensitivity of the n-type samples under stationary conditions had the same order of magnitude as obtained by F. Maesen (Phil. Res. Repts., 15, 107, 1960). That of the p-type samples reached the value 0.05 a /v.w. On pulsed excitation at low temperatures time of photoconductivity decrease the p-type samples was considerably reduced. No photocurrent was recorded 100 - 150 μsec after the end of the light pulse at 160°K. The time of photoconductivity decrease in n-type crystals became longer with falling temperature. From a study of the frequency dependence of the electroluminiscence a minority carrier lifetime of 0.008 to 0.02 μsec was obtained for n-type SiC at room temperature. The investigations of electroluminiscence and photomagnetic effect showed that the minority carriers are rapidly captured in both types of samples, so the photocurrent is monopolar. The peculiarities of the falling off curves can be explained statistically by introducing a classification of traps according to boundary lines and Fermi quasi-levels (A. Rose. Phys. Rev.,

Card 2/3

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97, 322, 1955; Proc. IRE, 43, 1850, 1955). There are 5 figures.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova-Lenina (Leningrad Electrotechnical Institute imeni V. I. Ul'yanov-Lenin)

SUBMITTED: June 19, 1962

Card 3/3

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUYANOV, G.F.

Relaxation of photoconductivity and the lifetime of current carriers in silicon carbide. Fiz. tver. tela 4 no.11:3170-3176 N '62. (MIRA 15:12)

1. Leningradskiy elektrotekhnicheskiy institut imeni Ul'yanova-Lenina.
(Photoconductivity) (Silicon carbide)

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L 18122-63 EWP(q)/EWT(m)/BDS · AFFTC/ASD JD S/0181/63/005/007/1940/1945

ACCESSION NR: AP3003894

AUTHORS: Fridel', I.; Kholuyanov, G. F.

TITLE: Emission of electrons from p-n junctions in SiC by the diffusion of nitrogen

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1940-1945

TOPIC TAGS: electron, emission, p-n junction, Si, C, N, diffusion, n-layer, microplasma, etching, emission factor, work function, "hot" electron

ABSTRACT: Emission of "hot" electrons was obtained from p-n junctions by diffusion of N in p-type SiC in the temperature range 20-400C. Preliminary etching of the initial crystal surfaces was used to obtain structures that contained considerable microplasma, able to emit electrons not only from the periphery of the p-n junction but also from regions some distance away. The authors examined the dependence of emission currents on the reverse current through p-n junctions and on the voltage across the samples. With no special coating to reduce the work function of electrons from the thin disturbed n-layer of a p-n junction, emission currents up to 300-330 microamps (20C) were obtained with an emission factor of $(2-3)\cdot10^{-4}$. The authors conclude that p-n junctions may be considered potential sources of electrons, but that certain trends should be observed in improving these sources:

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ACCESSION NR: AP3003894

4

1) lowering the work function, 2) careful examination of the problem relative to optimal thickness of the disturbed n-layer, and 3) lowering the operating voltage and obtaining more rigid volt-ampere characteristics in the region of breakdown. "In conclusion the authors express deep thanks to E. Ye. Violin for his active aid in preparing p-n junctions and in carrying out the experiment, and also to M. B. Reyfman for kindly furnishing samples of crystals." Orig. art. has: 4 figures.

14

ASSOCIATION: Leningradskiy electro-tekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Electrical Engineering Institute)

SUBMITTED: 11Mar63 DATE ACQ: 15Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 004 OTHER: 007

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

VIOLINA, G.N.; YE LYAN-SYU [Yeh Liang-hsiu]; KHOLUYANOV, G.F.

Optical absorption and electric properties of n-type α-SiC. Fiz. tver. tela 5 no.12:3406-3412 D '63. (MIRA 17:2)

1. Leningradskiy elektrotekhnicheskiy institut imeni Ul'yanova (Lenina).

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BR

ACCESSION NR: AP4013587 S/0181/64/006/002/0593/0601

AUTHORS: Violin, E. Ye.; Kholuyanov, G. F.

TITLE: Recombination radiation and the electrical properties of diffusion p n junctions in SiC

SOURCE: Fizika tverdogo tela, v. 6, no. 2, 1964, 593-601

TOPIC TAGS: recombination phenomenon, electrical property, p n junction, electroluminescence, diffusion junction, fused junction, silicon carbide

ABSTRACT: The authors have examined p-n junctions obtained by diffusion of aluminum in n-type SiC. The initial crystals were n-type SiC(6H) with resistivities ranging from 0.01 to 5 ohm cm (20C). Measurements were made for recombination radiation (electroluminescence) for different currents through the p-n junction at different temperatures, on the volt-ampere characteristics of these junctions in the transmission direction at various temperatures, and on the temperature dependence of specific capacity at different potentials across the junction. Measurements were made for fused junctions as well as for diffusion junctions (in the same crystals). The temperature range of the investigations was from 80 to 800K.

Card 1/2

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

ACCESSION NR: AP4013527

A substantial difference was observed in the electroluminescence spectrum for the two types of junctions. This difference is due to the difference in depth of the Fermi level in the zone where the recombination occurs. "In conclusion, the authors offer their sincere thanks to M. B. Reyfman, A. V. Frolov, D. A. Yas'kov, Yu. M. Tairov, and I. V. Pichugin for kindly supplying the crystals, and also to M. Lizets, graduate student at LETI, for active participation in the work and for measuring the electroluminescence spectra of the fused p-n junctions." Orig. art. has: 8 figures.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Institute of Electrical Engineering)

SUBMITTED: 26Jul63 DATE ACQ: 03Mar64 ENCL: 00

SUB CODE: EC, SS NO REF SOV: 004 OTHER: 012

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L 19775-65 EWT(l)/EWT(m)/EEC(b)-2/EWP(b) IJP(c)/SSD/AFWL/ASD(a)-5/ASD(m)-3/
AS(mp)-2/AFMDC/RAEM(e)/ESD(gs)/ESD(t)
ACCESSION NR: AP4039656 S/0181/64/006/006/1696/1701

AUTHORS: Violin, E. Ye.; Kholuyanov, G. F.

TITLE: Electroluminescence and photoluminescence of diffused p-n junctions in SiC

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1696-1701

TOPIC TAGS: electroluminescence, photoluminescence, diffused junction, p n junction, silicon carbide, semiconductor, Hall effect, Fermi level

ABSTRACT: The authors have studied the structure, electroluminescence, and photoluminescence of diffused junctions made in 6H and 4H polytypes of n-type SiC. Examinations of oblique polished sections show that electroluminescence and photoluminescence of p-n junctions are associated with an activated layer of n-type SiC. Variations in conditions of preparing p-n junctions show that the formation of such layers is apparently due to the diffusion of boron. The presence of aluminum among the diffusing elements helps to produce a p layer with a high concentration of holes. Acceptor atoms in n-type SiC cause the Fermi level to shift toward the middle of the forbidden band during compensation. This may affect photoluminescence and its spectrum. Boron atoms in n-type SiC are not only compensated by

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ACCESSION NR: AP4039656

acceptors, but they serve as activators of photoluminescence and electroluminescence. Measurements of the Hall effect indicate the activation energy of boron acceptors to be about 0.35-0.38 ev. It was found that boron in SiC is necessary, but not sufficient, for the formation of a photoluminescent band at about 2 ev. Not all n-type SiC containing boron shows photoluminescence or electroluminescence in this band. The authors conclude that the incident boron atoms (or some of them) are components of more complex luminescence centers, forming by association during diffusion of boron ions with positive donor ions. "In conclusion, we express our sincere thanks to M. B. Reyfman, D. A. Yas'kov, Yu. N. Tairov, and I. V. Pichugin for kindly supplying the crystals, and we thank V. Migunov, a graduate student at LETI, for his great assistance in studying the structures of the p-n junctions."
Orig. art. has: 6 figures.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina) (Leningrad Electrical Engineering Institute)

SUBMITTED: 27Dec63 ENCL: 00

SUB CODE: SS, OP NO REF SOV: 002 OTHER: 003

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L 17162-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/AFWL/ASD(m)-3/AFMDC/ASD(a)-5/
AEDC(a)/AS(mp)-2/SSD/RAEM(e)/ESD(gs)/ESD(t) JD
ACCESSION NR: AP4048409 S/0181/64/006/011/3336/3340

AUTHOR: Kholuyanov, G. F.

TITLE: Polytypism and recombination emissions of p-n junctions obtained by diffusion of boron in n-SiC

SOURCE: Fizika tverdogo tela, v. 6, no. 11, 1964, 3336-3340

TOPIC TAGS: recombination emission, p n junction, silicon carbide diode, boron, electroluminescence, photoluminescence, crystal structure

ABSTRACT: Continuing an earlier investigation (with E. Ye. Violin, FTT v. 6, 1696, 1964), in which it was shown that diffusion of boron in n-SiC results in p-n junctions with intense electroluminescence and photoluminescence, the author examines the dependence of recombination radiation on the different structures (polytypes) in which the SiC can crystallize. The crystal structures investigated were

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3C (β-SiC), 8H, 15R, 6H, and 4H (C, H, R — cubic, hexagonal, rhombohedral; the numeral denotes the number of atoms per unit cell). The method of obtaining p-n junctions and the apparatus for measurement of the radiation were described in the earlier paper. An analysis of the different electroluminescence and photoluminescence spectra, and the similarity in the temperature variation of the photoluminescence of boron-activated layers, give grounds for assuming that in all cases the impurity centers responsible for the radiation are of the same origin. The possible role of boron in the formation of these centers is briefly discussed. The differences between the types are manifest in the width of the forbidden band and in the shifts of the maxima of some bands. "In conclusion the author is deeply grateful to M. B. Reyfman and A. A. Pletyushkin for supplying the crystals, and also E. Ye. Violin and B. M. Morgulis for help in preparing the p-n junctions." Orig. art. has: 4 figures, 2 unnumbered formulas, and 1 table.

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ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul' yanova (Lenina) (Leningrad Electrotechnical Institute)

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722220001-5

KHOLUYANOV, Georgiy Fedorovich ; OLESK, A.O., red.

[Low-voltage electroluminescent indicators for transistor circuits] Nizkovol'tnye elektroliuminestsentnye indikatory dlia tranzistornykh skhem. Leningrad, 1965. 18 p.
(MIRA 18:5)

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L 5404-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG
ACC NR: AP5027400 SOURCE CODE: UR/0181/65/007/011/3241/3245

AUTHOR: Kholuyanov, G. F.

ORG: Leningrad Electrical Engineering Institute (Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova [Lenina])

TITLE: The part played by boron, nitrogen and gallium in the electroluminescence of carbide-silicon p-n junctions

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3241-3245

TOPIC TAGS: silicon carbide, pn junction, boron, nitrogen, gallium, electroluminescence, photoluminescence

ABSTRACT: The author investigates the function of boron and gallium in the electro-luminescence of silicon carbide. These impurities were added by diffusion to nitrogen-doped *n*-SiC crystals (6H polymorph). The nitrogen concentration in the original crystals was studied with regard to its effect on the electroluminescence and photoluminescence in specimens with boron and on the electroluminescence spectra of alloyed *p-n* junctions. It is shown that gallium diffusing into the crystals causes two types of electroluminescence with spectral maxima of 2.6 and 2.53 ev

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(20°C). These types of luminescence are studied in a wide temperature range. The first type is caused by radiative electron transitions from the conduction band to acceptor levels in gallium, while the second is due to transitions between levels in a more complex center of the donor-acceptor type. A model of this type of center can also be used for the best explanation of experimental data on electroluminescence and photoluminescence in specimens with boron. Nitrogen is discussed as a possible coactivator of boron. In conclusion, the author is sincerely grateful to M. B. Reyfman and V. P. Novikov for kindly supplying the crystals, and also to E. Ye. Violin for considerable assistance in preparing the diffusion *p-n* junctions. Orig. art. has: 4 figures.

SUB CODE: SS/ SUBM DATE: 15May65/ ORIG REF: 005/ OTH REF: 004

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L 18843-66 EWT(1)/EWT(m)/EWP(t) IJP(c) JD
ACC NR: AP6006856 SOURCE CODE: UR/0181/66/008/002/0583/0584

AUTHOR: Lizets, M.; Kholuyanov, G. F.

ORG: Leningrad Electrical Engineering Institute im. V. I. Ul'yanov (Lenin) (Leningradskiy elektrotekhnicheskiy institut)

TITLE: The part played by tellurium in electro- and photoluminescence of GaP *pn* junctions

SOURCE: Fizika tverdogo tela, v. 8, no. 2, 1966, 583-584

TOPIC TAGS: tellurium, pn junction, gallium compound, phosphide, electroluminescence, photoluminescence, metal diffusion, band spectrum, temperature dependence

ABSTRACT: Since tellurium is one of the most widely used dopants for producing *n*-conductivity in gallium phosphide, the authors study the contribution of this element to electroluminescence and photoluminescence in GaP. The crystals were doped during growth from the melt to a concentration of approximately 10^{18} cm^{-3}. The *pn* junctions were produced by zinc diffusion at 800-900°C in a stream of helium. Alloyed contacts were used. Photoluminescence was observed only in the undoped speci-

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mens before zinc diffusion. The red photoluminescence maximum is located at 1.9 ev, and the width of the band at one-half maximum is 0.22 ev. The band shifts toward lower energies as the temperature is increased in conformity with the change in the width of the forbidden band. Low-temperature photoluminescence is observed in all specimens after zinc diffusion. The photoluminescence spectrum of the *p*-layer consists of two bands with maxima at 1.82 and 2.12 ev. The surface layers of the specimens were partially compensated by zinc in order to study the effect of tellurium on the photoluminescence of *n*-GaP. After this special treatment, the tellurium-doped specimens showed a photoluminescence spectrum with a maximum at 1.7 ev. The width of this band was 0.27 ev at half the maximum. Specimens with a lower tellurium concentration showed a second band with a maximum at 1.95 ev. The relative fraction of the photoluminescence in this band decreases as the temperature is increased. The electroluminescence spectra of *pn* junctions in specimens with tellurium at low temperatures also show a band at approximately 1.7 ev. The width of this band shows practically no increase with temperature and the maximum shows no displacement. These specimens show an additional band at 2.1 ev at 80°K which disappears at room temperature. The color of the electroluminescence varies from reddish yellow at 80°K to cherry red at 300°K. In conclusion the authors are sincerely grateful to A. Ya. Nashel'skiy for graciously furnishing the gallium phosphide

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ACC NR: AP6006856

crystals and also to G. Zaydel' for assistance in preparing the specimens with pn junctions. Orig. art. has: 2 figures.

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